


A map of the Middle East and surrounding regions, including parts of Europe, North Africa, and Central Asia. The map shows countries like Turkey, Iraq, Iran, and others, along with major bodies of water like the Black Sea, Caspian Sea, and Persian Gulf. The title text is overlaid on the map.

U.S. Department of Energy Oil Spill Response Programs and Web Site Resources

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Robert B. Shelton

A map of the Black and Caspian Seas region, showing countries like Belarus, Ukraine, Moldova, Bulgaria, Georgia, Armenia, Azerbaijan, Turkey, Iran, Iraq, Kazakhstan, Uzbekistan, Turkmenistan, and Lebanon. The Black Sea and Caspian Sea are labeled. A decorative wavy line separates the title from the list.

A series of workshops are being held to provide information on oil spill cleanup methodologies and technologies for the Black and Caspian Seas

- A cooperative effort between government and industry to achieve environmental goals
- Workshop topics include:
 - Basic information on oil spills
 - Contingency planning
 - Legal and administrative frameworks for addressing oil spills
 - Technologies for oil spill containment and cleanup
- A government sponsored web system is maintained for use by workshop participants (and others) after completion of the workshops



★ **Odessa, Ukraine**

★ **Constanta, Romania**

Tbilisi, Republic of Georgia ★

Astana, Kazakhstan ★

Almaty, Kazakhstan ★

DOE Workshops

A background map of the Black Sea region, showing countries like Ukraine, Romania, Georgia, Armenia, Azerbaijan, Kazakhstan, and Turkey. The Black Sea, Caspian Sea, and Aral Sea are labeled. Workshop locations are marked with dots: Odessa, Ukraine (1999); Constanta, Romania (2000); Douala, Cameroon (2000); Tbilisi, Georgia (2000); Astana, Kazakhstan (2001); and Almaty, Kazakhstan (2001).

- **US-Kazakhstan Workshop on Marine Science, May 30, 2001, Almaty, Kazakhstan**
- **Workshop on Legal and Legislative Issues with Implementing National and Regional Oil Spill Response Systems, April 18-19, 2001, Astana, Kazakhstan**
- **Workshop on Water Modeling for Oil Spill Response, January 22-26, 2001, Tbilisi, Republic of Georgia**
- **Workshop on Oil Spill Response Contingency Planning, November 1-3, 2000, Douala, Cameroon (Africa)**
- **Workshop on Black Sea Environment and Oil Spill Response, July 25-27, 2000, Constanta, Romania**
- **Workshop on Legal and Legislative Issues Associated with Implementing National and Regional Oil Spill Response Systems, June 20-22, 2000, Tbilisi, Republic of Georgia**
- **Workshop on a Regional Oil Spill Emergency Response System for the Black Sea, September 14-17, 1999, Odessa, Ukraine.**

Workshop Sponsors

- **International Maritime Organization (IMO)**
- **International Oil Pollution Compensation Fund (IOPCF)**
- **International Petroleum Industry Environmental Conservation Association (IPIECA)***
- **International Tanker Owners Pollution Federation (ITOPF)**
- **National Oceanic and Atmospheric Administration (NOAA)**
- **Oak Ridge National Laboratory, Engineering Science & Technology Division**
- **Oil Spill Response Ltd. (OSRL)***
- **U.S. Agency for International Development (USAID)**
- **U.S. Army Corps of Engineers**
- **U.S. Department of Defense, Partnership for Peace Information Management Services (PIMS)**
- **U.S. Department of Energy, Office of International Policy**
- **U.S. Navy**

*** All photos and training materials in this presentation were provided by IPIECA and OSRL.**

Environmental Baselines

A map of the Middle East and surrounding regions, including parts of Europe, North Africa, and Central Asia. The map shows major countries like Turkey, Iraq, Iran, Syria, Jordan, Israel, Lebanon, Cyprus, Georgia, Armenia, Azerbaijan, Kazakhstan, Uzbekistan, Turkmenistan, Ukraine, Romania, Bulgaria, Macedonia, Albania, Yugoslavia, Bosnia, Hungary, and Belarus. It also depicts major bodies of water such as the Black Sea, Caspian Sea, Aral Sea, and the Mediterranean Sea, along with significant rivers like the Danube, Dnieper, Volga, and Euphrates. The title 'Environmental Baselines' is prominently displayed in the center of the map.



Ukrainian Scientific Center
Of the Ecology of Sea

Hydrophysics

[Hydrobiology](#)

[Hydrochemistry](#)

Pollution

[Sources of Pollution of a coastal zone of the Black Sea](#)

Atmospheric Chemistry

Radioecology

The Catalogue

A topographical map of the Eastern Mediterranean, Middle East, and surrounding regions. The map shows countries including Belarus, Hungary, Ukraine, Romania, Moldova, Bulgaria, Macedonia, Albania, Yugoslavia, Georgia, Armenia, Azerbaijan, Iran, Iraq, Syria, Jordan, Israel, Lebanon, Cyprus, Kazakhstan, Uzbekistan, and Turkmenistan. Major bodies of water like the Black Sea, Caspian Sea, and Aral Sea are labeled. Rivers such as the Dniester, Danube, Volga, and Euphrates are also shown. A thick, wavy horizontal line in shades of blue and brown crosses the map, representing a sea surface or a spill. The title 'Environmental Impacts of Oil Spills at Sea' is overlaid in large, bold, dark green text.

Environmental Impacts of Oil Spills at Sea









Crude monument to human arrogance

WITH 130,000 TONS OF CRUDE STILL ABOARD

Fight against time to save rare
coast from pollution threat
tide of death to the nation's
wildlife treasure

Pollution of destruction
SPILL SHOCKS WHITE BRINK
black tide of destruction
BIRDS AND SEALS
FACE BLACK DEATH
ONE HULL DOWN
A SCANDAL
Playing Russian roulette with a natural paradise
THE COST
NEGLECT
Sea saga sinks
into black farce
Oil slick

Disaster averted
Tugs fight to stop slick from tanker polluting wilderness reserve

Typical
media
headlines
during a
major spill



Methodologies for Decision Making

Net Environmental Benefit Analysis (NEBA)

- Strongly encouraged to use NEBA
- A science based approach
- Examines the overall implications of strategy choices
- Requires understanding and data about the area threatened
- Part of contingency planning



Contingency Planning



The map displays the following geographical features and labels:

- Countries:** BELARUS, HUNGARY, UKRAINE, ROMANIA, MOLDOVA, BOSNIA, YUGOSLAVIA, MACEDONIA, ALBANIA, BULGARIA, GREECE, TURKEY, GEORGIA, ARMENIA, AZERBAIJAN, KAZAKHSTAN, UZBEKISTAN, TURKMENISTAN, IRAN, IRAQ, SYRIA, JORDAN, ISRAEL, LEBANON, CYPRUS.
- Bodies of Water:** Black Sea, Caspian Sea, Aral Sea, Persian Gulf.
- Mountains:** Caucasus.
- Rivers:** Dniester, Danube, Volga, Euphrates.

Planning Process

Information Gathering

Risk assessment
Type, movement and fate of oil; traffic; current and wind conditions; historic spill data

Resources at risk
Ecological
Industrial
Amenity

Sensitivity maps

Strategy Development

NEBA

Spill scenarios

Tiered response

Protection priorities

Strategy options

Operational Plan

Reporting
Assessment
Mobilisation
Organisation
Equipment
Management

Liaison, training, exercising and updating are essential

Strategies for Addressing an Oil Spill



Strategies

- Monitor and evaluate
- Dispersants
- Contain and recover
- Protection
- Shoreline clean-up
- Other options
 - burning
 - bioremediation

Basic Surveillance



- Aerial observation
 - visual
 - camera
 - video
 - remote sensing
- Consider slick trajectory and liaison with pilot to locate slick
- Document observations for both tactical operations and historic records



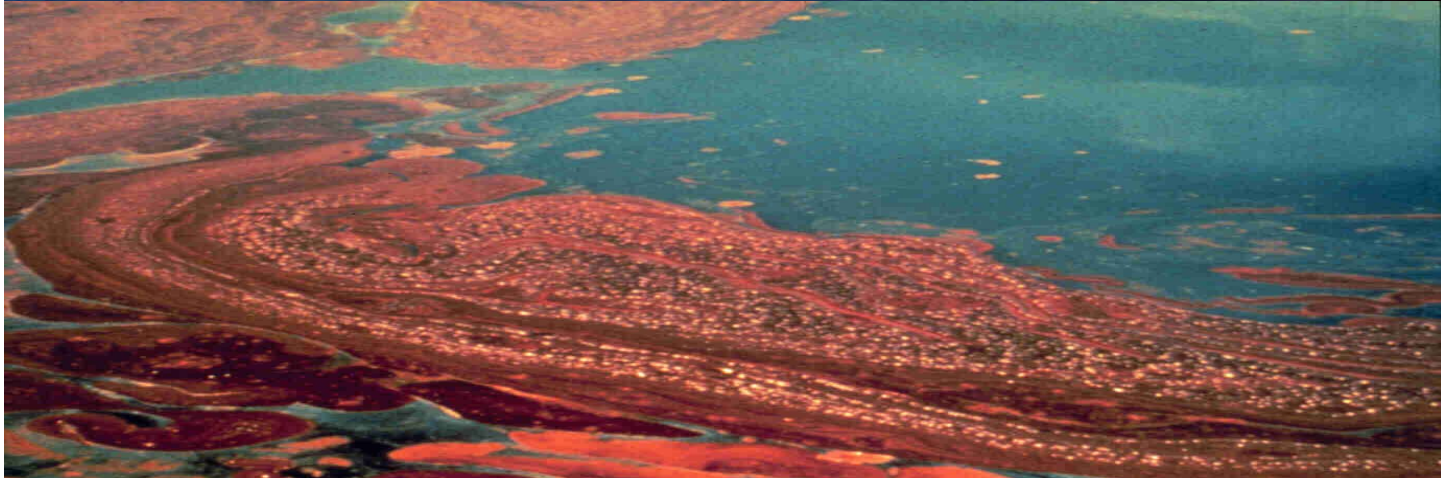
Sheen



Black oil



Emulsion



Remote Sensing

- Side looking airborne radar (SLAR)
 - all weather and night operation
 - large area coverage
 - dependent on wind conditions and no oil thickness
- Ultra violet (UV)
 - produce video
 - detect all hydrocarbon - no oil thickness
 - clear daylight only
- Thermal infra red (TIR)
 - night operation
 - produce video
 - relative oil thickness
 - cannot penetrate cloud



Dispersants



- What is a dispersant?
 - solvents
 - surfactants
- What does it do?
 - enhances natural dispersion by reducing the oil-water 'interfacial tension'
 - redistributes oil into the water

An aerial photograph of a large body of dark blue water. In the upper left, a white tugboat with a red stripe is moving, leaving a white wake. To the left of the center, a small orange buoy is visible. Several faint, light-colored patches are scattered across the water's surface. Three text labels with white borders are overlaid on the image: 'Small patch of oil' in the top right, 'White patches of dispersant only - no oil' in the center, and 'Dispersed oil' in the bottom right.

Small patch of oil

**White patches of
dispersant only - no oil**

Dispersed oil

Contain and Recover

- High capital investment
- Logistics
- Operational limitations
- Encounter rate
- Training
- Temporary storage & disposal



Wave Following Characteristics





Ro-skim pump

Komara 12 K disc skimmer



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Protection

- Prioritization of sensitivities
- Effective use of available resources
- Logistics and practicality
- Cost effectiveness

In-Situ Burning

Combustion requires:

- igniters
- low water content in oil
- minimum oil thickness (~3mm)
- specialized containment booms



Shoreline Clean-up

- Shoreline type
 - sensitivity
 - amenity
 - access
- Project management
 - labor intensive
 - low-technology
 - logistics










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A key component of the process has been the web-based information system

The Black Sea and Caspian Sea Environmental Information Center web site (<http://pims.ed.ornl.gov>), created by ORNL for DOE, facilitates information flow and dialog between the countries of the region. It provides information on:

- oil spill clean-up, monitoring and related commercial technologies,
- scientists' requests for research partners;
- various countries' laws, regulations, and standards;
- publication of scientific papers, and on-line discussions of these issues; and,
- individuals and companies working on Black Sea and Caspian Sea environmental issues.

The workshops have been a successful collaboration between U.S. government and industry. The workshops have:



- Educated agency and legislative leaders as to key oil spill issues;
- Helped government agencies and legislators develop contingency plans and necessary supporting legislation; and
- Transferred basic information on methodologies and technologies for oil spill clean-up.